

(No Model.)

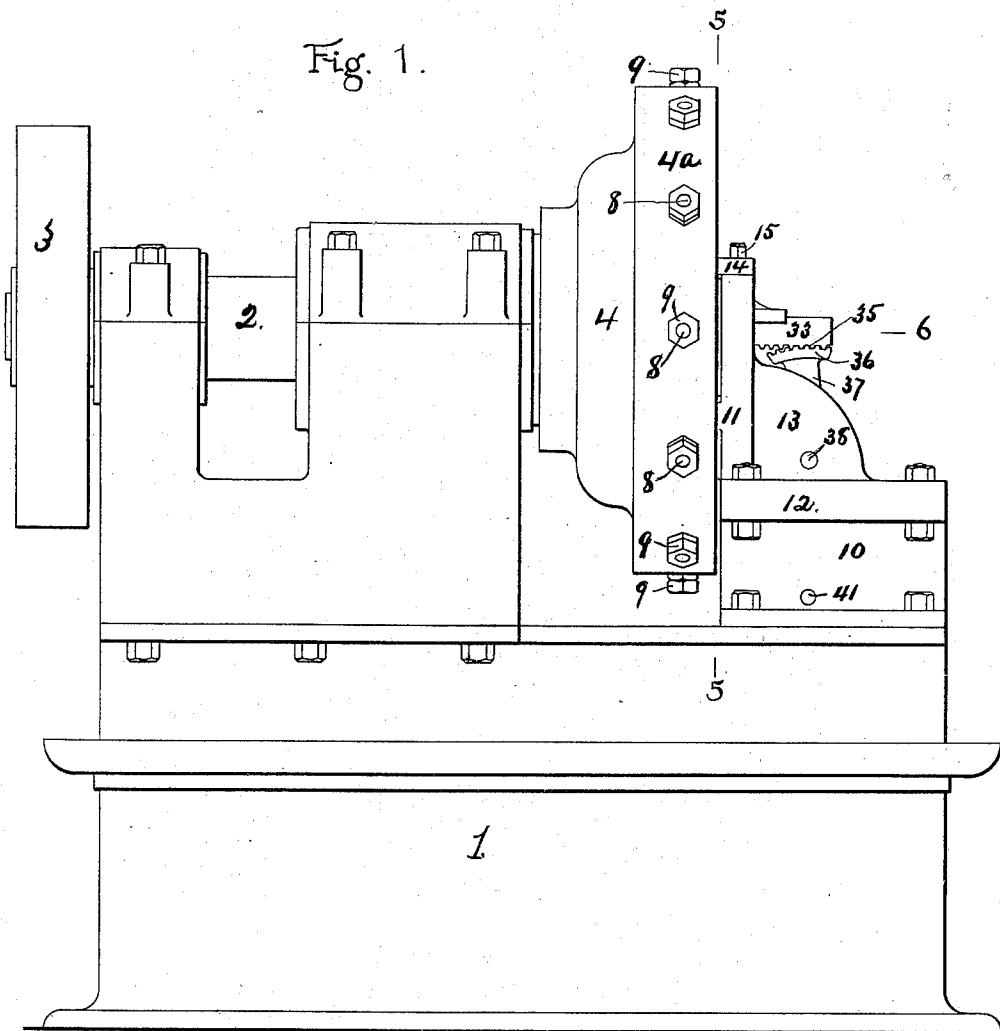
4 Sheets—Sheet 1.

W. H. WIGGIN.
WIRE SWAGING MACHINE.

No. 565,821.

Patented Aug. 11, 1896.

Fig. 1.



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By his Attorney: Arden S. Fitch.

(No Model.)

4 Sheets—Sheet 2.

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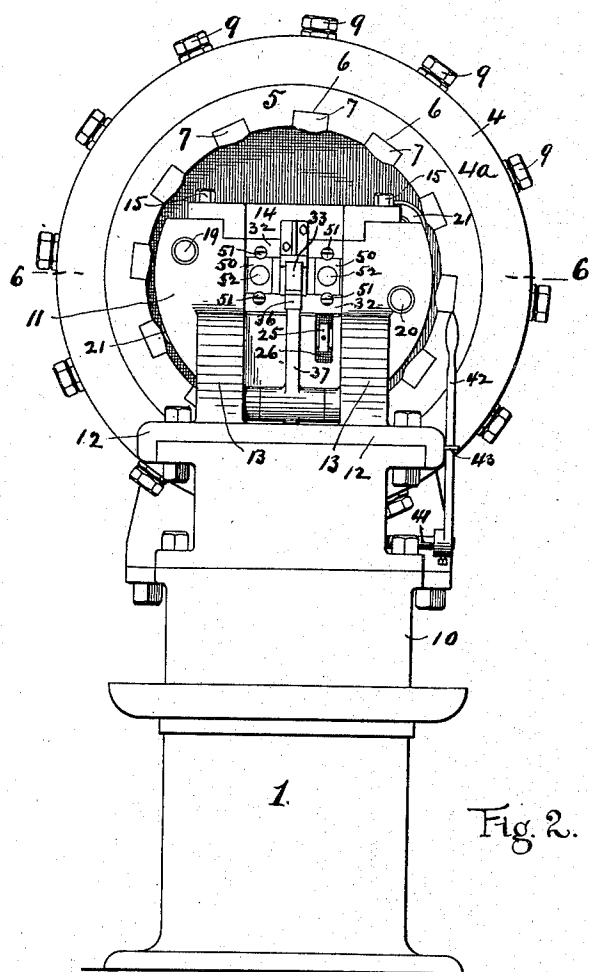


Fig. 2.

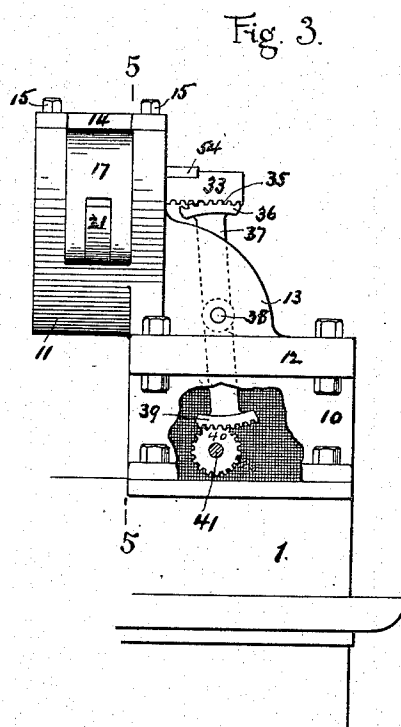
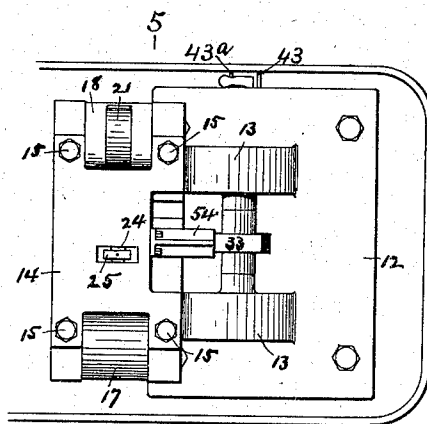


Fig. 3.

Fig. 4.



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(No Model.)

4 Sheets—Sheet 3.

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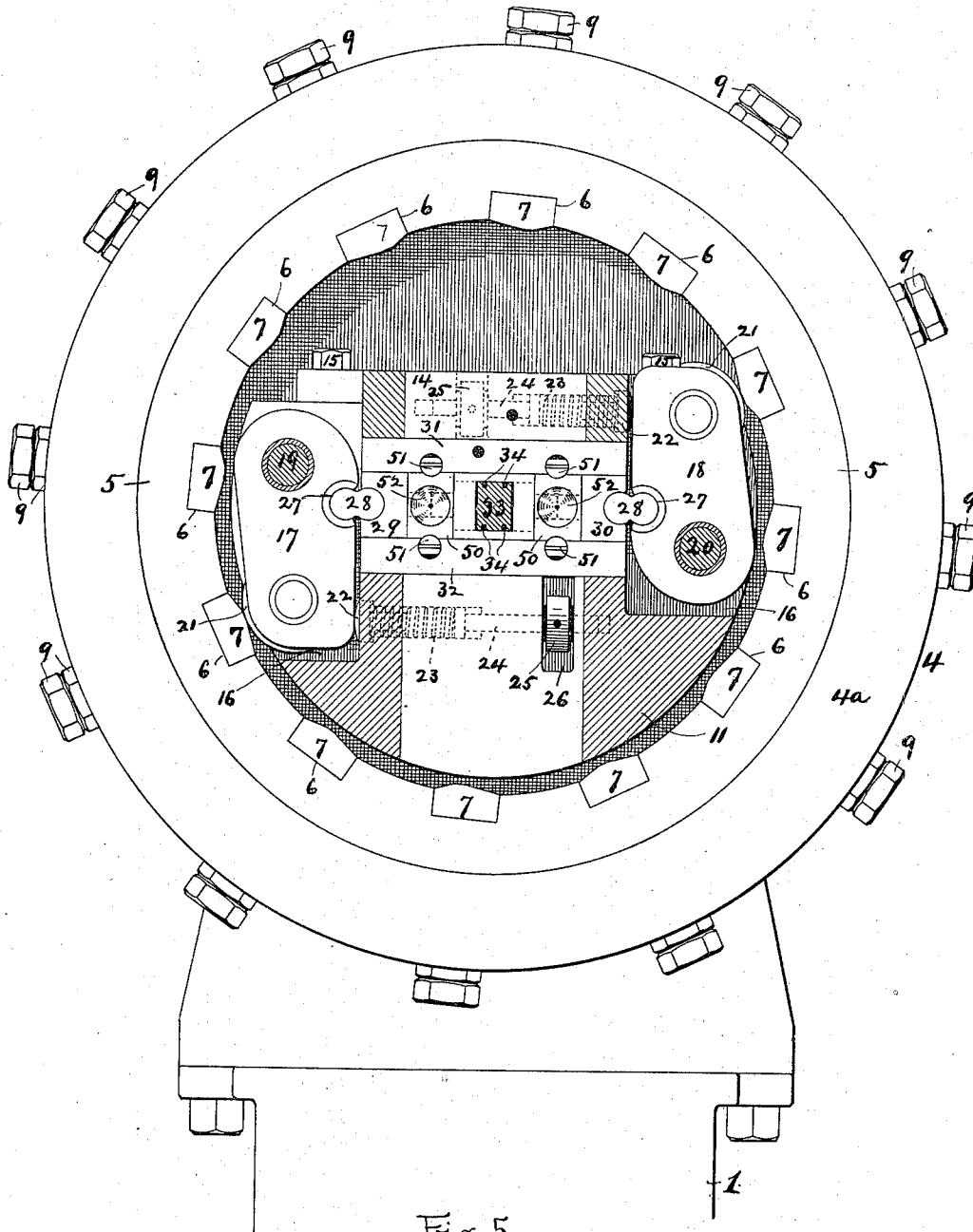


Fig. 5.

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Fig. 6.

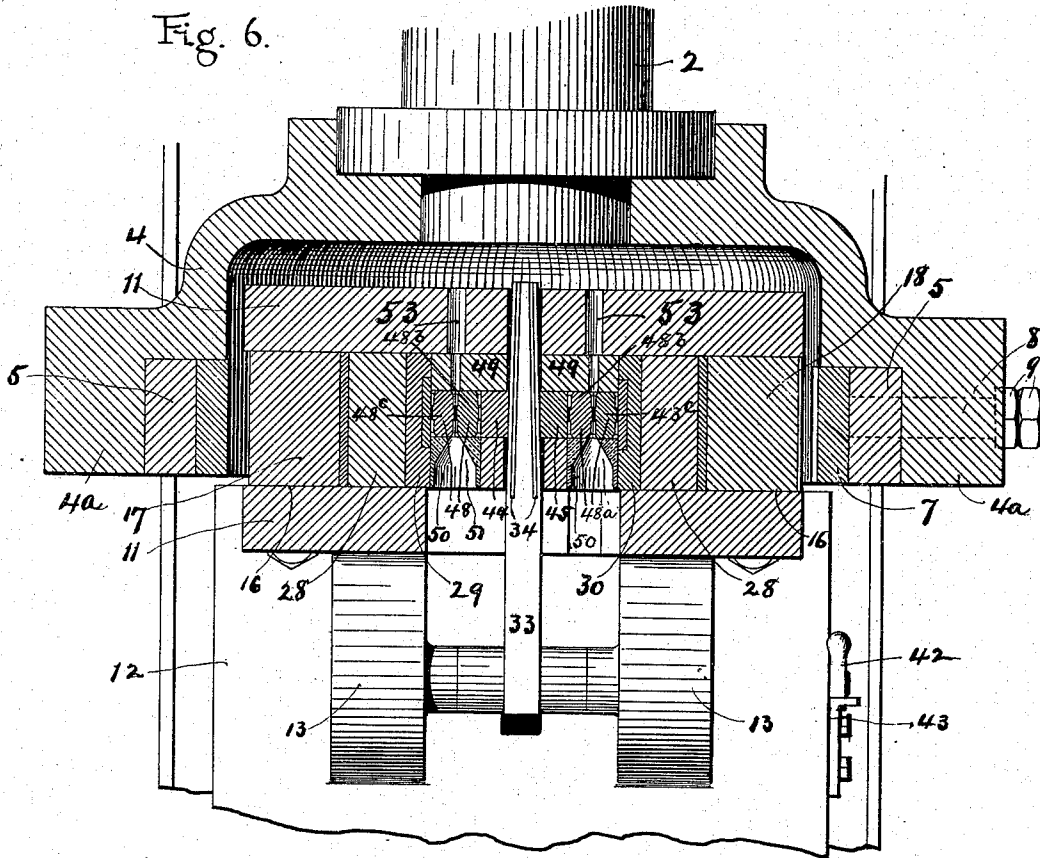
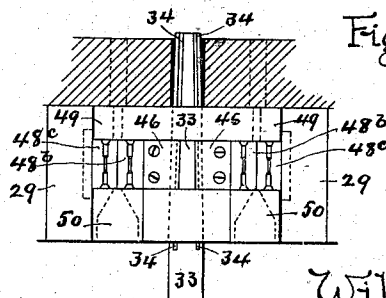


Fig. 8.



Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM H. WIGGIN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE
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WIRE-SWAGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 565,821, dated August 11, 1896.

Application filed May 9, 1896. Serial No. 590,851. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. WIGGIN, a citizen of the United States, residing at Worcester, county of Worcester, State of Massachusetts, have invented certain new and useful Improvements in Wire-Swaging Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to wire-swaging machines employed to compress wire in the formation of bicycle-spokes, needles, and analogous articles; and the primary object of my invention is to provide a machine to simultaneously compress more than a single piece of wire and thereby to enlarge the capacity of a machine of this class; and my invention has the further objects of conducing the durability of the operative parts of the machine, accurately controlling during the operation of the machine the degree of action of the swaging-dies upon the wire, and effecting the relief of the wire from the action of said dies when desired.

My invention consists, primarily, in the combination, in a wire-swaging machine, with pairs of swaging-dies, of a support common to and seated and movable between opposed faces of the anvil members of said pairs of dies and adapted to sustain said anvil members at different distances apart from each other, together with actuating mechanism adapted to impart swaging movement to the reciprocating members of said pairs of dies; and my invention comprises the several parts and devices in a machine of this class, hereinafter shown and described, as the same are constructed and combined to operate in the manner hereinafter set forth and as the same are more particularly specified in the claims herein.

In the drawings, Figure 1 is a side elevation of a wire-swaging machine containing the several features of my invention. Fig. 2 is a front end elevation of the same. Fig. 3 is a side elevation of the stationary supporting-stand which I preferably employ to hold the swaging-dies. Fig. 4 is a plan of the same. Fig. 5 is a front end enlarged sectional elevation of the head carrying the mechanism

for actuating the swaging-dies and the die-supporting frame, taken on line 5 5 of Figs. 3 and 4. Fig. 6 is an enlarged sectional plan of the same parts, taken on line 6 6 of Fig. 2. Fig. 7 is a diagrammatic plan of two pairs of swaging-dies in the die-supporting frame and followers at the outward faces of the working members of said pairs of dies, together with a preferable form of the movable support seated between the opposed faces of the anvil members of said pairs of dies and mechanism connected to and operated by said support and preferably employed in connection therewith to effect the adjustment relatively to each other and to sustain in such adjusted position the anvil members of said pairs of dies in conformity to my invention; and Fig. 8 is a lateral section of the device preferably employed to operatively connect anvil-blocks to the said movable support for the purposes of the invention.

In the drawings, 1 indicates the main frame or standard of the machine, upon which the operative parts are mounted.

At 4 is shown a head comprising a recessed shell 4^a, in which are carried the cams 7 for actuating the swaging-dies. For the purposes of the principal feature of the invention it is preferable that this head is revoluble, and to accomplish this it may be mounted on the end of a shaft 2, having bearings on the machine-frame and provided with a driving-pulley 3, as shown.

The head 4 is preferably constructed with a ring 5 within the shell 4^a, and provided with transverse grooves 6, in which are fitted the cam-blocks 7, provided with stems 8, which extend radially through said ring and shell and have their outward ends threaded to severally receive nuts 9, which serve to draw the cam-blocks against the inward face of said ring and hold them in place in the respective transverse grooves therein.

The die-supporting frame 11 is preferably, for the purposes of the principal feature of the invention, stationary in the machine; and to accomplish this and to enable it to be seated within the circular range of described cam-blocks in the revoluble head 4 in position to enable the dies supported by it to be actuated by said cam-blocks and to be readily with-

drawn from the head 4 or be unshipped of the machine the said supporting-frame may be conveniently mounted upon and project or overhang from the rearward edge of a base-plate 12, to which it may be reinforcedly united by ribs 13, the said frame and its base-plate and uniting-ribs being desirably cast in one piece, and such homogeneous structure being mounted on a suitable standard 10 10, fixed on the machine-frame in front of the head 4, as shown, with the frame 11 projected into the cam-ring in said head.

The die-supporting frame is preferably segmental in form, as shown, centrally recessed 15 downwardly from its plane upward face to accommodate the swaging-dies and their hereinafter-described adjunctive mechanism, and the said recess may be closed by a cap 14, held to the plane face of the segmental frame 20 by screws 15, while the frame is preferably provided with laterally-extended way-plates 31 and 32 in its recess, together with a back plate 49 and removable front plates 50 for the convenient seating therein of the herein- 25 after-described swaging-dies.

In carrying out the primary feature of my invention I employ pairs of swaging-dies 48 and 48^a, seated in the recessed frame 11 and preferably between the way-plates 31 and 32 30 therein, and a support 33, seated and movable between the opposed faces of the anvil members 48^b of said pairs of dies and adapted to sustain said anvil members at different distances apart from each other, in conjunction 35 with mechanism, which may be that herein-after particularly shown and described, in operative engagement with the reciprocating members 48^c of said pairs of dies and the range of actuating-cams 7, to impart, in connection with said cams, swaging movement 40 to said working members of said pairs of dies.

In the machine illustrated in the drawings two pairs of swaging-dies are shown seated in the same horizontal plane between the 45 plates 31 and 32 in the recess in the frame 11, and it will be found desirable to employ this number of pairs of dies in a machine of this class in conforming to this principal feature of my invention. The movable support 50 between the anvil members of the pairs of dies is preferably in the form of a wedge, as shown, capable of sliding movement in its seat in the direction parallel and desirably coincident with the axis of the head 4, and 55 when employed in connection with two pairs of dies, as shown, the vertical sides of the wedge are the inclines, and its upper and lower faces may be parallel planes, while the anvil members aforesaid are provided with 60 correspondingly-inclined faces opposed to the inclines on the wedge, by means of the anvil-blocks hereinafter specified. The movement of the said wedge-support may be effected, controlled, and its position relatively to the anvil members of the pairs of 65 dies may conveniently be defined and fixed by means of a lever 37, pivoted in the ma-

chine-frame at 38, and one arm of which engages, as by a sector 36 thereon, meshing a rack 35 on the under face of the outer end of 70 the wedge-support, while the other arm is in actuating engagement with a rock-shaft 41, as by a sector 39 on said arm of the lever meshing a pinion 40 on said shaft, the said rock-shaft being provided with an operative 75 hand-lever 42, adapted to engage adjustable stops 43 and 43^a on the machine-frame to limit and determine the movement thereof, and by means of these devices the movement of said wedge-support may be effected and 80 controlled and its position fixedly adjusted during the operation of the swaging-dies.

At 44 and 45 are shown anvil-blocks which are desirably employed in a machine of this class, and are respectively interposed be- 85 tween the opposed faces of the anvil members of the pairs of dies and the support 33. In the construction shown these anvil-blocks are respectively seated between the inclined faces of the wedge-support 33 and the opposed 90 faces of the anvil members of the pairs of dies, and the faces of the said anvil-blocks adjacent to the inclined faces of said wedge-support are correspondingly inclined to fit thereto, as shown. The anvil-blocks are 95 harnessed to the wedge-support, so that the movement of the support in one direction by its described actuating mechanism will throw the blocks away from each other and the movement of the support in the opposite di- 100 rection will draw the blocks together, and this may be conveniently accomplished by means of plates 46, attached to the upper and under faces of said blocks and reaching over the described upper and under faces of 105 the wedge-support and provided with lips 47, entering grooves 34, formed in the said faces of the wedge-support, parallel, respectively, with the inclined side faces of said wedge-support. It is evident that in this arrange- 110 ment the oscillation of the rock-shaft 41, and consequent vibration of the lever 37, and reciprocal movement of the wedge-support will, by affecting the movement of the anvil-blocks, as described, cause the anvil members 115 of the pairs of dies to more or less approach or recede from the working members thereof, so that in this way the degree of action of the swaging-dies upon the wire they are compressing may be accurately controlled during 120 the operation of the machine, or the entire relief of the wire from the action of said dies may be effected at pleasure.

The mechanism which I preferably employ in connection with the range of cam-blocks 125 to actuate the dies comprises levers 17 and 18, working in lateral recesses 16 in the die-supporting frame, and respectively pivoted at their upper and lower ends on studs 19 and 20, and provided at their free ends with friction-rolls 21, and governed by spring-actuated 130 bolts 22 to vibrate the levers to carry their friction-rolls into the path of the cams 7, together with follower-blocks 29 and 30, respec-

tively, carried by said levers 17 and 18, and adapted to play in the central recess in the die-supporting frame and impinge upon the outward faces of the reciprocating members of the respective pairs of dies therein.

The actuating devices for the bolts 22 may conveniently be composed of the spiral springs 23, seated about said bolts in recesses in the machine-frame, and tension-adjusting bolts 24, acting upon the springs and controlled by nuts 25, which are adapted to be turned on their bolts by a spanner, but are held from end-wise movement within slots 26, as shown.

The follower-blocks 29 and 30 may be conveniently seated between the plates 31 and 32 in the die-supporting frame and may be respectively connected to the levers 17 and 18 by links 28, seated at one end in semicircular recesses 27 in the levers and at their opposite ends in similar recesses in said blocks.

The hereinbefore-described front plates 50 on the recessed die-supporting frame are preferably provided with outwardly-flared lateral apertures 52, which severally inwardly register with the entrances to the matrices in the respective sectional swaging-dies, as shown, to readily guide the wire fed to the dies into said matrices, and the back plate 49 and rearward part of the frame 11 are provided with apertures 53, which register with the exits from the said matrices in said dies and fall within the internal diameter of the shaft 2, which is hollow for the purposes hereof, so that the wire may extend backward from the dies through said back plate and frame and into the hollow shaft.

The front plates 50 are desirably held in place between the plates 31 and 32 by segmental-headed screws 51, seated near the adjacent edges of the front faces of the plates 31 and 32, respectively, so that by turning said screws to bring the plane portions of their segmental heads coincident with the said edges of said plates 31 and 32 the plates 50 and the dies may be readily unseated and withdrawn from the die-frame.

It will be understood that the die-frame herein shown and described, together with the head for holding the cams and the mechanism for operatively connecting the actuating-cams to the die-followers, as herein set forth, may be employed in connection with and to impart swaging movement to a single pair of dies; and it will be further understood that mechanism, such as is well known and employed for the purpose, may be used for holding and feeding the wire to be swaged to the swaging-dies, although the same is not shown herein, it forming no part of this invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a wire-swaging machine, the combination with pairs of swaging-dies, of a support common to and seated and movable between opposed faces of the anvil members of said pairs of dies and adapted to sustain said anvil members at different distances apart from

each other, together with actuating mechanism adapted to impart swaging movement to the reciprocating members of said pairs of dies; whereby the anvil members of each pair of dies are designed to be moved toward and from each other at predetermined times; substantially as and for the purpose specified.

2. In a wire-swaging machine, the combination with pairs of swaging-dies, of a support common to and slidably mounted between said pairs of dies, and having inclined faces opposed to correspondingly inclined faces provided on anvil-blocks interposed between said support and the anvil members of said pairs of dies, together with actuating mechanism adapted to impart swaging movement to the working members of said pairs of dies; substantially as and for the purpose specified.

3. In a wire-swaging machine, the combination with a fixed die-supporting frame, pairs of swaging-dies seated therein, a support common to and seated and movable between opposed faces of the anvil members of said pairs of dies and adapted to sustain said anvil members at different distances apart in said frame, and actuating mechanism carried by said frame adapted to impart swaging movement to the reciprocating members of said pairs of dies, together with a revoluble recessed head adapted to have said die-supporting frame seated within it, and carrying operative mechanism adapted by the rotation of said head to actuate the swaging mechanism carried by said frame; substantially as and for the purpose specified.

4. In a wire-swaging machine the combination with a die-supporting frame, of pairs of swaging-dies movably seated therein, anvil-blocks seated between the opposed faces of the anvil members of said pairs of dies and actuating mechanism adapted to simultaneously impart swaging movement to the reciprocating members of said pairs of dies; whereby the pairs of dies will support each other in the direction of the swaging movement of said reciprocating members thereof; substantially as and for the purpose specified.

5. In a wire-swaging machine, the combination with a die-supporting frame, of pairs of swaging-dies movably seated therein, anvil-blocks seated in said frame between and movable toward and from opposed faces of the anvil members of said pairs of dies, a support in said frame common to, seated and movable between and in actuating engagement with said anvil-blocks, and adapted to sustain said blocks at different distances apart from each other together with followers movably seated in said frame adjacent to the reciprocating members of said pairs of dies, and actuating mechanism adapted to reciprocate said followers to impart swaging movement to said reciprocating members of said pairs of dies; substantially as and for the purpose specified.

6. In a wire-swaging machine, the combination with a die-supporting frame, of two pairs of swaging-dies seated therein in the same

plane, with the outward faces of their anvil members opposed to each other, a support common to and seated and movable between said opposed faces of said anvil members and adapted to sustain the same at different distances apart from each other, together with actuating mechanism adapted to impart swaging movement to the reciprocating members of said pairs of dies; whereby the anvil members of both said pairs of dies are designed to be moved toward and from each other at predetermined times; substantially as and for the purpose specified.

7. In a wire-swaging machine, the combination with a die-supporting frame and two pairs of swaging-dies seated therein in the same plane, with the outward faces of the anvil members thereof parallel and opposed to each other, of a wedge-block seated in said frame and common to and slidably mounted between and with its inclined faces opposed to said outward faces of said anvil members, and anvil-blocks having inclined faces fitting to said inclined faces of the wedge-block, movably seated in the frame between said faces of the wedge-block and said anvil members, and provided with lips adapted to engage and traverse grooves in said wedge-block; substantially as and for the purpose specified.

8. In a wire-swaging machine, the combination with a die-supporting frame and two pairs of swaging-dies seated therein, of a wedge-block seated in said frame in actuating engagement with and slidably mounted between opposed corresponding faces provided on anvil-blocks interposed between said wedge-block and the anvil members of said pairs of dies, together with a lever in actuating engagement with said wedge-block and engaged with and actuated by a rock-shaft, and an adjustably-controlled lever carried by and operating said rock-shaft; substantially as and for the purpose specified.

9. In a wire-swaging machine, the combination with a die-supporting frame and two pairs of swaging-dies seated therein, of a wedge-block seated in said frame in actuating engagement with, and slidably mounted between, opposed corresponding faces provided on anvil-blocks interposed between said wedge-block and the anvil members of said pairs of dies, together with a rack on the said wedge-block, a rock-shaft carrying a pinion, a lever pivoted in said frame and provided on its respective arms with sectors to respectively engage the rack on the wedge-block

and the said pinion, and an actuating-lever on said rock-shaft; substantially as and for the purpose specified.

10. In a wire-swaging machine, a die-supporting frame, comprising a base adapted to be fixedly mounted on the machine-frame, and a block on and projecting from an edge of said base, recessed to accommodate the dies and their actuating mechanism, in combination with a recessed revoluble head carrying the devices for operating the die-actuating mechanism, said frame being adapted, when in position in the machine, to reach into and sustain its dies and their said mechanism within said head; substantially as and for the purpose specified.

11. In a wire-swaging machine, the combination of a stationary die-supporting frame, swaging-dies seated in said frame, levers respectively pivoted in said frame upon diametrically opposite sides thereof and operatively connected with said dies, together with a revoluble head inclosing said die-frame and levers, a series of cams in said head to act upon said levers, and springs seated in said frame and engaging said levers to throw them into the path of said cams; substantially as and for the purpose specified.

12. In a wire-swaging machine, the combination of a stationary die-supporting frame, swaging-dies seated in said frame, levers respectively pivoted in said frame upon diametrically opposite sides thereof and operatively connected with said dies, together with a revoluble head inclosing said die-frame and levers, a series of cams in said head to act upon said levers, springs seated in said frame and engaging said levers to throw them into the path of said cams, and means for adjusting the tension of said springs, substantially as and for the purpose specified.

13. In a wire-swaging machine, the combination with a revoluble head and cams carried thereby, of a die-supporting frame composed of a base, adapted to be fixedly mounted on the machine-frame, and a recessed segmental block, provided with a standard to detachably attach it to said base and adapted when in position to project within said revoluble head, and wire-swaging mechanism seated in said block and adapted to be actuated by said cams in said head, substantially as and for the purpose specified.

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